

Support for the amendments are found at page 1, lines 28 – 32, page 2, lines 14 and 15, page 5, lines 10 – 12, particularly page 7, lines 32, 33 and 29 – 35, page 8, lines 1 – 14 and the examples. Claims 1 – 9 and 33 – 50 have been withdrawn from consideration in view of the restriction requirement.

It has been well known in the art that although hafnocene catalyst obtain high molecular weight polymer products, hafnocene catalyst systems manifest relatively poor activity as compared with the titanocene and zirconocene catalyst systems. In accordance with Applicants' invention it has been discovered that hafnocene based catalyst systems containing certain alkyl substituent on the bulky ligand manifest highly improved activity. This improved activity as compared with the activity of hafnocene catalysts not containing the certain alkyl group is respectfully submitted to be highly unexpected. It is respectfully believed there is nothing in the art which would lead one of ordinary skill to predict that by placing the certain alkyl groups on the bulky ligand(s) of hafnocene catalysts the activity would greatly increase. Table 1 found on page 24 of the specification shows that the catalysts in accordance with the claimed invention obtain activities that are about 50 times greater and yields that are about 10 to 20 times greater as compared with hafnocenes not in accordance with the claimed invention. The unexpectedness and unobviousness is all the more clear when one notes that the improved activity and yields were obtained without loss in the high molecular range that is desirably obtained.

Claims 10 – 12, 16 and 17 have been rejected under 35 U. S. C. § 102(e) as being clearly anticipated by Turner et al. (Turner). This rejection is respectfully traversed. No where within the four corners of Turner is there any disclosure of the hafnocenes now instantly claimed. More particularly, Turner does not disclose any hafnocenes having at least one alkyl group having from 3 to 10 carbon atoms substituted on the bulky ligand. Withdrawal of the rejection is respectfully asked.

Claims 10 – 32 have been rejected under 35 U. S. C. § 103 (a) as being unpatentable over Cheruvu et al. (Cheruvu). It is the examiner's position that Cheruvu generically teaches the hafnium analogs of zirconocenes used in the process of Cheruvu and that one of ordinary skill in the art would expect the analogous hafnocene compounds

to produce satisfactory results in the process of the reference. This rejection is respectfully traversed.

It is respectfully submitted that the examiner errs in stating that one of ordinary skill in the art would expect the analogous hafnocene compounds to produce satisfactory results in the process of the reference. It is well known by those of ordinary skill in the art that although hafnocenes can obtain high molecular weight polymer product, it is done so at the expense of activity. Thus, it well known in the art that hafnocene catalysts at least for olefin polymerization processes manifest poor catalytic activity. In any event, Cheruvu's invention is directed toward increasing molecular weight. Cheruvu does not address the question of activity. Therefore, based on the actual knowledge in the art, one of ordinary skill would predict that the activity to be obtained, if employed in the disclosed process of Cheruvu, would be low. Contrary to that which is understood in the art, Applicants have discovered that the process employing the hafnocene recited in the instant claims unexpectedly obtains high activity and high molecular weight.

It is respectfully submitted that the examiner errs in holding that no probative weight can be given to the data. It is believed that the proper comparison is hafnocenes substituted as in the instant claims against hafnocenes not in the instant claims. The examples in this case clearly do that. The examples demonstrate that the hafnocenes in the instant claims unpredictably and unexpectedly manifest a very high activity (about 10 to 20 times greater than the comparative examples). A comparison with the zirconocenes would not demonstrate the patentable inventiveness of this invention because zirconocenes, as well known in the art, generally do manifest excellent activity, however, produce much lower molecular weight polymers compared to hafnocenes.

It is submitted that although the reference may disclose some hafnocenes, based on the teaching of the reference one would merely expect that in Cheruvu's process one would obtain improved molecular weight. Applicants' present claims are directed toward a process, not a composition. Applicants' process as demonstrated in the examples unobviously obtains a high activity. There is nothing in the four corners of Cheruvu's teachings or disclosure that would suggest to one of ordinary skill in the art that Cheruvu's generic disclosure would obtain hafnocenes that manifest high molecular weight.

It is respectfully submitted that the examiner has not produced a prima facie case of obviousness and hence In re Greenfield, et al. 197 USPQ 227 and In re Grasselli et al. 218 USPQ 769 are not applicable to this case.

It is respectfully submitted that the claims in this case are unobvious over Cheruvu and that this rejection should be withdrawn.

Claims 10 – 32 have been rejected under 35 U. S. C. § 103 (a) as being unpatentable over Jejelowo et al. (Jejelowo) in view of Cheruvu et al. (Cheruvu) and Tsutsui et al. (Tsutsui). This rejection is respectfully traversed. Each of the references relied upon in this rejection are directed toward improving molecular weight (and any properties associated with molecular weight and molecular weight distribution (MWD). The three references do not address improvements in catalytic activity by controlling substituents on the bulky ligand of a hafnocene. Neither Tsutsui nor Cheruvu disclose the claimed substituents on the bulky ligands of a hafnocene would result in an increase in activity and a high molecular weight. Jejelowo (Col. 12, lines 23 – 69) teach that the activity can be affected by manipulating the method of preparing the supported catalyst and by ratios of ingredients. It is respectfully submitted that if one were looking for a method of improving the catalytic activity of a hafnocene one would not look to references which are directed toward improving molecular weight and MWD of polymer product.

In any event it is believed that neither of the secondary references disclose any of the hafnocenes and polymerization process as instantly claimed. The examiner suggests that Cheruvu “teaches the use of closely related hafnium species”. Even if that were true it would not suggest applicants’ employing the enumerated hafnocenes recited in the instant claimed process in order to obtain an improvement in catalytic activity. Furthermore, even if Cheruvu does teach the use of closely related hafnium species, the examiner has not provided the nexus between these so called related species to the actual species recited in the claims.

Tsutsui does not recite any of the hafnocene recited in the instantly claimed process. Tsutsui specifically states that he uses “specific hafnium compounds” (Col. 4 line 63). The hafnium compounds used in accordance with Tsutsui are generically

discussed at Col. 9, lines 2 – 34. No where in Tsutsui are there any hafnocenes disclosed that are related to the hafnocenes employed in applicants process.

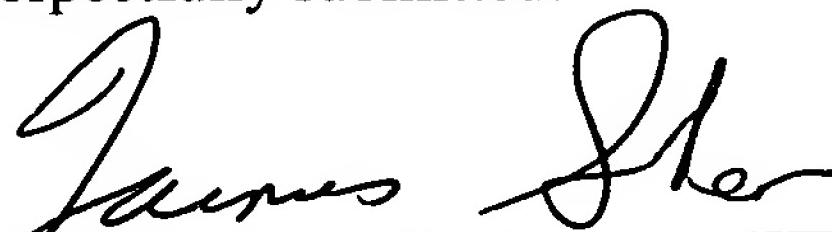
The examiner asserts that he believes that the analogous hafnium compounds would produce satisfactory results in the process of the primary reference. It is respectfully submitted that the hafnocenes of Tsutsui are not analogous to the hafnocenes recited in the instant claims. One may arguably hold that the hafnocenes of Cheruvu are analogous to the hafnocenes recited in the instant claims. Nevertheless, one of ordinary skill in the art would at most expect that by using the Cheruvu and /or Tsutsui hafnocenes in the Jejelowo process one would merely obtain some affect on MW and MWD. One would not predict based on the teaching of the secondary references that the claimed substituents would result in the unobvious improvement in catalytic activity. It is particularly evident that the substitution as suggested by the examiner would cause one of ordinary skill in the art to believe that one has merely provided another composition and process manipulation affecting MW since that is the essence of each of the references relied upon by the examiner. Applicants respectfully request that this rejection also be withdrawn.

A restriction requirement among claims 1 – 9, drawn to a catalyst; claims 10 – 33, drawn to a process, and claims 33 – 50 drawn to a polymer has been presented by the examiner. By telephone conversation between the examiner and Jaimes Sher on March 3, 1999 a provisional election was made with traverse to prosecute the invention recited in claims 10 – 33. This election is affirmed. Nevertheless it is respectfully asked that the restriction requirement be withdrawn and that all the claims in this case be examined on their merits. It is noted that the Group II and III claims fall in the same class and that the Group I claims fall in Class 500. A complete examination of the process would require searching Class 502, subclass 103 and Class 526, subclass 160. It is therefore respectfully submitted that examination of the Group I and II claims would be greatly facilitated if done together. It is similarly urged that a proper examination of the Group III claims would require a search of Class 526, subclass 160 and Class 502, subclass 103.

Withdrawal of the restriction requirement is respectfully asked.

In view of the above amendments and remarks it is respectfully submitted that the claims in this case are in condition for allowance. Prompt notice of allowance is respectfully solicited.

Respectfully submitted:



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